

4-1 Study Guide and Intervention

Writing Equations in Slope-Intercept Form

Write an Equation Given the Slope and a Point You can write an equation of a line if you are given a slope and a point other than the y-intercept.

Example 1: Write an equation of the line that passes through $(-4, 2)$ with a slope of 3.

The line has slope 3. To find the y-intercept, replace m with 3 and (x, y) with $(-4, 2)$ in the slope-intercept form. Then solve for b .

$$y = mx + b \quad \text{Slope-intercept form}$$

$$2 = 3(-4) + b \quad m = 3, y = 2, \text{ and } x = -4$$

$$2 = -12 + b \quad \text{Multiply.}$$

$$14 = b \quad \text{Add 12 to each side.}$$

Therefore, the equation is $y = 3x + 14$.

Example 2: Write an equation of the line that passes through $(-2, -1)$ with a slope of $\frac{1}{4}$.

The line has slope $\frac{1}{4}$. Replace m with $\frac{1}{4}$ and (x, y) with $(-2, -1)$ in the slope-intercept form.

$$y = mx + b \quad \text{Slope-intercept form}$$

$$-1 = \frac{1}{4}(-2) + b \quad m = \frac{1}{4}, y = -1, \text{ and } x = -2$$

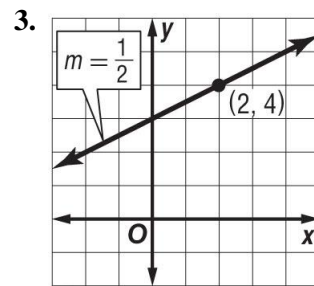
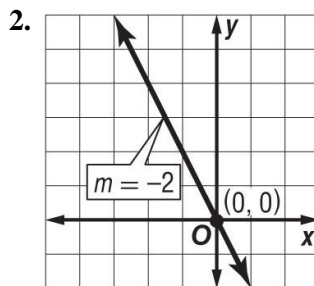
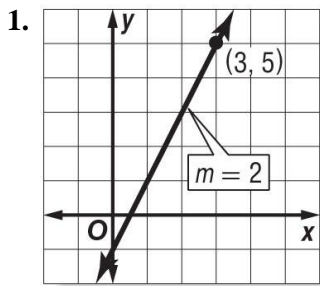
$$-1 = -\frac{1}{2} + b \quad \text{Multiply.}$$

$$-\frac{1}{2} = b \quad \text{Add } \frac{1}{2} \text{ to each side.}$$

Therefore, the equation is $y = \frac{1}{4}x - \frac{1}{2}$.

Exercises

Write an equation of the line that passes through the given point and has the given slope.



4. $(8, 2)$; slope $-\frac{3}{4}$

5. $(-1, -3)$; slope 5

6. $(4, -5)$; slope $-\frac{1}{2}$

7. $(-5, 4)$; slope 0

8. $(2, 2)$; slope $\frac{1}{2}$

9. $(1, -4)$; slope -6

10. $(-3, 0)$, $m = 2$

11. $(0, 4)$, $m = -3$

12. $(0, 350)$, $m = \frac{1}{5}$

4-1 Study Guide and Intervention (continued)

Writing Equations in Slope-Intercept Form

Write an Equation Given Two Points If you are given two points through which a line passes, you can use them to find the slope first. Then you can use that slope and one of the points to write the equation of the line.

Example: Write an equation of the line that passes through (1, 2) and (3, -2).

Find the slope m . To find the y -intercept, replace m with its computed value and (x, y) with $(1, 2)$ in the slope-intercept form. Then solve for b .

$$m = \frac{y_2 - y_1}{x_2 - x_1}$$

Slope formula

$$m = \frac{-2 - 2}{3 - 1}$$

$$y_2 = -2, y_1 = 2, x_2 = 3, x_1 = 1$$

$$m = -2$$

Simplify.

$$y = mx + b$$

Slope-intercept form

$$2 = -2(1) + b$$

Replace m with -2 , y with 2 , and x with 1 .

$$2 = -2 + b$$

Multiply.

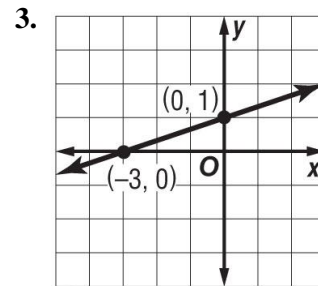
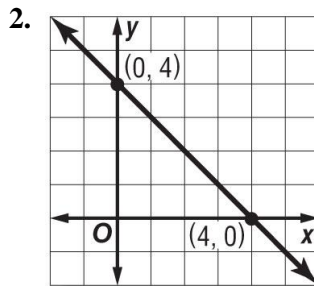
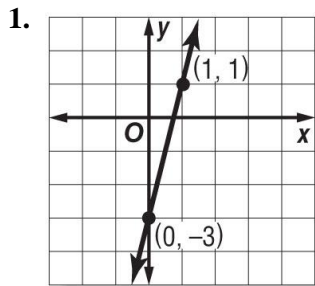
$$4 = b$$

Add 2 to each side.

Therefore, the equation is $y = -2x + 4$.

Exercises

Write an equation of the line that passes through each pair of points.



4. $(-1, 6), (7, -10)$

5. $(0, 2), (1, 7)$

6. $(6, -25), (-1, 3)$

7. $(-2, -1), (2, 11)$

8. $(10, -1), (4, 2)$

9. $(-14, -2), (7, 7)$

10. $(4, 0), (0, 2)$

11. $(-3, 0), (0, 5)$

12. $(0, 16), (-10, 0)$